

REMARKS

This response is made to the Official Action dated May 9, 2001. Claims 1-24 were rejected. By this response, Claims 1, 8, and 15 have been amended. Upon entry of these amendments, claims 1-24 will be pending in the present application. Reconsideration of the rejections and allowance of the pending claims are respectfully requested.

Claims 1, 8, and 15 are amended to clarify potentially confusing language and correct unintentional grammatical errors. The amendments do not include new matter and are fully supported by the specification. Further, the amendments are not made to limit the claims in any way beyond the limits of the original versions of the claims.

Rejections Under 35 U.S.C. § 102(b) – Anticipation by Mowbray et al.

The Examiner rejected claims 8 and 15 under 35 U.S.C. § 102(b) as being anticipated by Mowbray et al. (Pat. No. 4,300,873).

Anticipation under §102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). For a prior art reference to anticipate under §102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F. 2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990). The Applicant respectfully contends that the Examiner has not fully met the requirements as described in MPEP §2131 for a 102(b) anticipation rejection.

Claim 8

With respect to claim 8, the Examiner specifically stated:

“Mowbray discloses a reciprocating fuel pump comprising a resonant drive system including a resonant coil assembly (28) and a permanent magnet (29), one of the resonant coil assembly and the permanent magnet being disposed in a fixed position and the other of the resonant coil assembly and permanent magnet

being movable reciprocally by application of electrical current to the resonant coil assembly. . . .”

The Applicant disagrees that Mowbray et al. disclose a “coil assembly and permanent magnet being movable reciprocally by application of alternating polarity” as cited in amended claim 8. Mowbray et al. disclose a coil (28) which is used to drive an armature (29) in a single direction. Mowbray et al. specifically state that “When the winding is de-energised[sic] the spring 15 will return the plunger.” (Col. 2, lines 31-32). This is not the same as “being movable reciprocally by application of alternating polarity” claimed in the current invention.

The Applicant also disagrees that Mowbray et al. disclose a “permanent magnet” as an element in their apparatus. Mowbray et al. clearly disclose “an armature which is formed from magnetisable material.” (Col. 2, line 19-20). A magnetisable material implies transient magnetic properties, whereas a permanent magnet has the ability to maintain a magnetic field almost indefinitely. One skilled in the art would not recognize these two materials as equivalent. Additionally, from Mowbray et al., Fig. 1, element 29, a single material (the magnetisable material of Col. 2, lines 19-20) is shown for the armature, indicating an absence of an additional unclaimed permanent magnet. Nowhere in the entire Mowbray et al. disclosure is a permanent magnet stated or implied.

Therefore, at least two distinct elements of claim 8 are missing from the Mowbray et al. reference. The result is that Mowbray et al. fail to identically show in a single reference every element of the claimed invention. The absence in the disclosure of a reversing polarity applied to the coil to reciprocally drive the plunger in two directions and the absence in the disclosure of a permanent magnet are sufficient to render claim 8 patentable under §102(b). Therefore, the Applicant respectfully requests that amended claim 8 be allowed.

Claim 8 was not specifically rejected for §103(a) along with other claims, but was mentioned in the section containing obviousness rejections. The Applicant is confused by the Examiner's statement "one of ordinary skill in the art at the time the invention was made would recognize the interchangeability of the magnet and coil to actuate the pump." However, amended claim 8 states that "the drive system further comprising a drive member secured to and movable reciprocally with either the coil assembly or the permanent magnet." Amended claim 8 also recites "one of the coil assembly and the permanent magnet being disposed in a fixed position and the other. . . being movable reciprocally by application of alternating polarity to the coil assembly." However, reference to any "interchangeability" of the coil assembly and the permanent magnet is, in fact, probably an error in the Examiner's analysis. These elements themselves are not "interchangeable," but may be positioned fixed or movable within the motor assembly. Even if motor elements of the prior art devices were positionable differently, this would not reach the fundamental differences between the cited art and the claimed invention, including the lack of alternating polarity driving the coil assembly and the lack of a permanent magnet in the cited art.

Claim 15

In rejecting claim 15 for anticipation under §102 (b), the Examiner stated in part:

"Mowbray's drive system includes a permanent magnet (29) and a resonant coil assembly (28), the coil assembly being energizable to cause reciprocal movement of a drive member (27). . . ."

For some of the reasons stated above, the Applicant disagrees with the Examiner's interpretation of the disclosure as including all of the elements of amended claim 15. Mowbray et al. disclose a coil (28) which is used to drive an armature (29) in a single direction. Mowbray et al. specifically state that "When the winding is de-energised[sic] the spring 15 will return the plunger." (Col. 2, lines 31-32). The Applicant asserts that this is significantly different than the claimed invention. The

coil assembly in Mowbray et al. is not energized to cause reciprocal movement, it is only energized to cause unidirectional movement. Spring force works to return the plunger when the coil is de-energized.

The Applicant also disagrees with the Examiner's statement that "Mowbray's drive system includes a permanent magnet (29)." Mowbray et al., Figure 1, element 29, is listed as an armature. The armature is further defined in the specification as being formed from a "magnetisable material." (Col. 2, line 18-19). As stated above, a "magnetisable material" implies transient magnetic properties, whereas a permanent magnet has the ability to maintain a magnetic field almost indefinitely. Additionally, there is no separate reference to a permanent magnet recorded anywhere in the disclosure.

Because Mowbray et al. fail to disclose every element of amended claim 15, the Applicant respectfully asserts that the Examiner's §102(b) rejection simply cannot stand. Specifically, the lack of a permanent magnet in Mowbray et al. along with a lack of energizing the coil to drive the drive member in reciprocal directions, demonstrate patentability of claim 15. The Applicant therefore requests that amended claim 15 be allowed.

Rejections Under 35 U.S.C. § 103(a) – Mowbray et al.

The Examiner rejected claims 1-7, 9-14 and 16-24 under 35 U.S.C. § 103(a) as being unpatentable over Mowbray, et al. (4,300,873). The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the

Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). The Applicant respectfully traverses the rejection.

Claim 1

With respect to claim 1, the Examiner specifically stated;

“The coil assembly of Mowbray is not movable reciprocally axially along a central axis upon application of alternating current power to the winding, it is the permanent magnet which is movable.”

The Examiner goes on to argue that it is obvious to one skilled in the art that the coil can be “interchanged” with the magnet to actuate the pump.

As stated above, Mowbray et al. do not disclose moving the coil assembly “reciprocally axially along a central axis upon application of alternating polarity signals to the winding” as recited in amended claim 1. Additionally, there is no teaching or suggestion to drive the coil in two directions. The Applicant strongly disagrees with the Examiner that this element is obvious. The Examiner cannot maintain the rejection as obvious to one skilled in the art without providing some evidence of its obviousness. (See MPEP §2144.03). Therefore, because this element is neither present in the cited art nor obvious to one skilled in the art given the teachings of the reference, the rejection should be withdrawn.

The use of a permanent magnet is also absent from the cited art. Without some evidence of the obviousness of this element to one skilled in the art, the Examiner cannot maintain his claim that the permanent magnet is taught or suggested by Mowbray et al. MPEP §2143.03 requires all elements of the claimed invention to be present or taught by the combination of cited references. As a

distinct and novel feature of the claimed invention, the lack of a permanent magnet in the cited references is an additional reason for allowability of claim 1.

The Applicant respectfully asserts that the Examiner has not met all of the requirements necessary for a *prima facie* §103(a) rejection. The allowability of claim 1 under §103(a) is clearly demonstrated by the lack of teaching that the coil is driven in two directions and the lack of teaching that a permanent magnet should be used.

Claims 2-7

Claims 2-7 ultimately depend on amended claim 1. The rejections for these claims are traversed for reasons of their dependence on claim 1 as well as for their own separate and novel features.

Claims 8 and 15

Claims 8 and 15 were not specifically rejected under §103(a) and the Applicant respectfully believes that the §102(b) rejection has been overcome, as noted above. Therefore, the Applicant believes that amended claims 8 and 15 are allowable as written and contain patentable subject matter.

Claims 9-14 and 16-24

Claims 9-14 and 16-24 ultimately depend on amended claims 8 and 15. The §103(a) rejections for these claims are respectfully traversed by virtue of their dependence on claims 8 and 15 as well as for their own independent and patentable features.

Attachment

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

Conclusion

In view of the above remarks set forth above, Applicant respectfully requests allowance of all of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Amended claims 1, 8, and 15:

1. (Amended) A reciprocating fuel pump comprising:
a housing assembly including a drive section and a pump section;
a drive assembly disposed in the drive section, the drive assembly including a permanent magnet and a coil assembly having a winding and disposed within the central volume of the drive section adjacent to the permanent magnet and movable reciprocally axially along a central axis upon application of alternating ~~current power~~ polarity signals to the winding; and

a pump member secured to and movable reciprocally with the coil assembly, the pump member extending into the pump section to produce pressure variations in the pump section during reciprocal movement to draw fuel into the pump section and to express fuel therefrom.

8. (Amended) A reciprocating fuel pump comprising:
a ~~resonant~~ drive system including a ~~resonant~~ coil assembly and a permanent magnet, one of the ~~resonant~~ coil assembly and the permanent magnet being disposed in a fixed position and the other of the ~~resonant~~ coil assembly and permanent magnet being movable reciprocally by application of ~~electrical current~~ alternating polarity to the ~~resonant~~ coil assembly, the drive system further comprising a drive member secured to and movable reciprocally with either the coil assembly or the permanent magnet; and

a pump assembly adjacent to the drive system, the drive member extending into the pump assembly for generating increases and decreases in fluid pressure within the pump assembly during reciprocal movement to draw fuel into the pump assembly and to express fuel therefrom.

15. (Amended) A reciprocating pump comprising:

a drive system including a permanent magnet and a ~~resonant~~ coil assembly, the coil assembly being energizable to cause reciprocal movement of a drive member; and

a pump assembly disposed adjacent to the drive system, the pump assembly including means for admitting a supply of fluid into an inner volume of the pump assembly, means for pressurizing the inner volume by reciprocal movement of the drive member, and means for expressing pressurized fluid from the inner volume.